BELOV, K.A.; VOLKOVA, O.B.; MAKSIMOVA, M.I.; OGLOBLIN, N.D.; LUK'YANCHENKO, V.N.; TUL'CHINSKAYA, A.Ya.

Effect of the chemical composition of the reagents, used for coal flotation, on their activity. Koks i khim. no.8:8-12 '62. (MIRA 17:2)

1. Khar'kovskiy politekhnicheskiy institut (for Belov, Volkova, Maksimova). 2. Khar'kovskiy gornyy institut (for Ogloblin, Luk'yanchenko, Tul'chinskaya).

BURSHTAR, M.S.; BELOV, K.A.; GASANGUSEYNOV, G.G.; ZNAMENSKIY, V.A.; L'VOV, M.S.; PUSTIL'NIKOV, M.R.

Principal results of geological prospecting and problems of regional investigations in the Northern Caucasus. Geol. nefti i gaza 8 no. 1:23-29 Ja '64. (MIRA 17:5)

1. Severo-kavkazskiy sovet narodnogo khozyaystva i Vsesoyuznyy nauchno-issledovatel'skiy geologorazvedochnyy neftyanoy institut.

BELOV, K.A.; KOZLOV, A.L.; URINSON, G.S.

Gas industry of Stavropol Territory. Gaz. prom. 7 no.2:7-9 '62.
(MIRA 17:6)

TERNOVOY, Yu.V.; BELOV, K.A.

Crustal subsidence in the North Stavropol Pelagiad gas field. Gaz. delo no.9:7-12 '65. (MIRA 18:9)

1. Stavropol'skaya KNIL.

BELOV, K.L.

AID P - 5394

Subject : USSR/Engineering

Card 1/1 Pub. 103 - 24/28

Author : Belov, K. L.

Title : Composite stamp for making machine bottom boxes

Periodical : Stan. i instr., 9, 36, S 1956

Abstract : The author describes a stamp to make parts for machine bottom boxes of sheet aluminum or brass. This stamp can do flanging, cold stamping, and chasing in practically one operation. One drawing.

Institution : None

Submitted : No date

16(1)

AUTHOR: Belov,K.M.

SOV/20-127-2-1/70

TITLE: On the Uniqueness of the Definition of Surfaces of Positive Curvature Having a Boundary

PERIODICAL: Doklady Akademii nauk SSSR,1959,Vol 127,Nr 2,pp 239-241 (USSR)

ABSTRACT:

Given a surface $r(u,v) \in W_p^{(3)}(\Gamma)$, $p>2$, with a positive Gaussian curvature inclusive the boundary. In a suitable coordinate system let $ds^2 = \Lambda(u,v)(du^2+dv^2)$, $\Lambda>0$, where the parameters in the unit circle Γ change with the boundary S. According to I.N. Vekua, the Codazzi equations are written in the form

$$(1)\quad \frac{\partial w}{\partial \bar{z}} + \frac{\bar{w}}{2\sqrt{K+|w|^2}}\frac{\partial w}{\partial z} + \frac{w}{2\sqrt{K+|w|^2}}\frac{\partial \bar{w}}{\partial z} + \frac{\partial \ln \Lambda}{\partial z} w + \frac{1}{2\sqrt{K+|w|^2}}\frac{\partial K}{\partial z} = 0 ,$$

where $w(z) = \frac{1}{2}(b_2^{\,2}-b_1^{\,1}) + ib_1^{\,2}$, $b_j^{\,i}$ are the mixed components of the second quadratic form of the surface and K is the Gaussian curvature. For (1) the author considers the linear boundary value problem

$$(2)\quad \mathrm{Re}(z^n w)_S = g(s), \quad n>0,$$

where g(s) satisfies the Hölder condition with the exponents

On the Uniqueness of the Definition of Surfaces of Positive Curvature Having a Boundary

SOV/20-127-2-1/70

λ, $0<\lambda\leq 1$.

Theorem: (1)-(2) has at most one solution in $W_p^{(1)}(\Gamma)$.

Theorem: Let F and F* be two isometric surfaces with a positive curvature; $F, F^* \in W_p^{(3)}(\Gamma)$, $p>2$. If in the corresponding boundary points $a(s) = a^*(s)$ or $b-H = b^*-H^*$, where a is the geodesic torsion, b is the normal curvature of a curve on the surface, H is the mean curvature, then F either is congruent to F* or it is symmetric to F*.

Theorem: Two isometric surfaces of positive curvature, the boundaries of which are curvature lines, are congruent or symmetric.

Two further theorems contain the same assertion for isometric surfaces of positive curvature, the boundaries of which consist

Card 2/3

On the Uniqueness of the Definition of Surfaces of Positive Curvature Having a Boundary

SOV/20-127-2-1/[illegible]

of umbilical points or are bisectrices of the angles between the curvature lines.

The author thanks I.N.Vekua and N.V.Yefimov.

There are 4 references, 1 of which is Soviet, 1German, and 2 French.

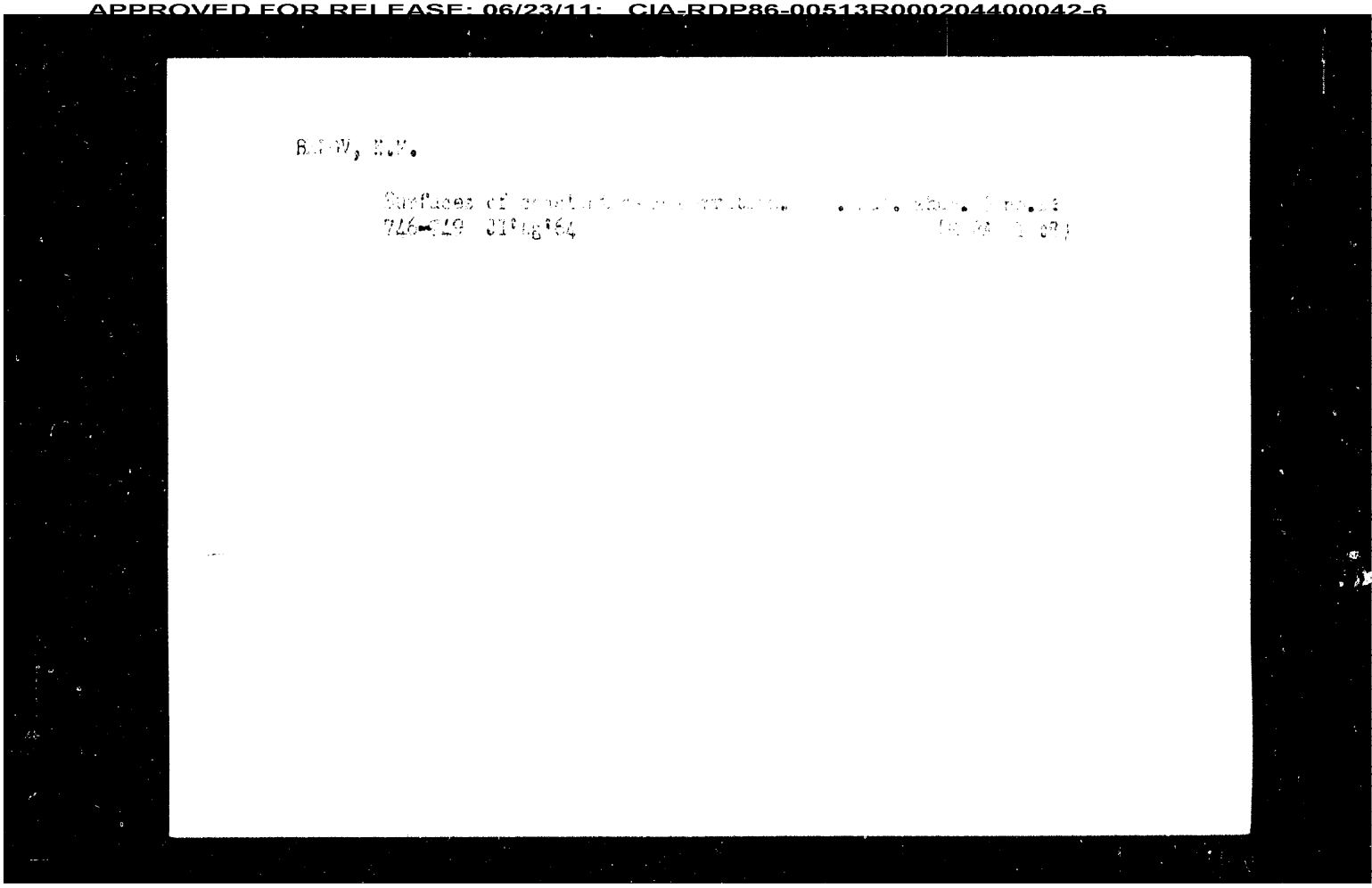
ASSOCIATION: Matematicheskiy institut imeni V.A.Steklova Akademii nauk SSSR (Mathematical Institute imeni V.A.Steklov AS USSR)

PRESENTED: April 3, 1959, by I.N.Vekua, Academician

SUBMITTED: April 1, 1959

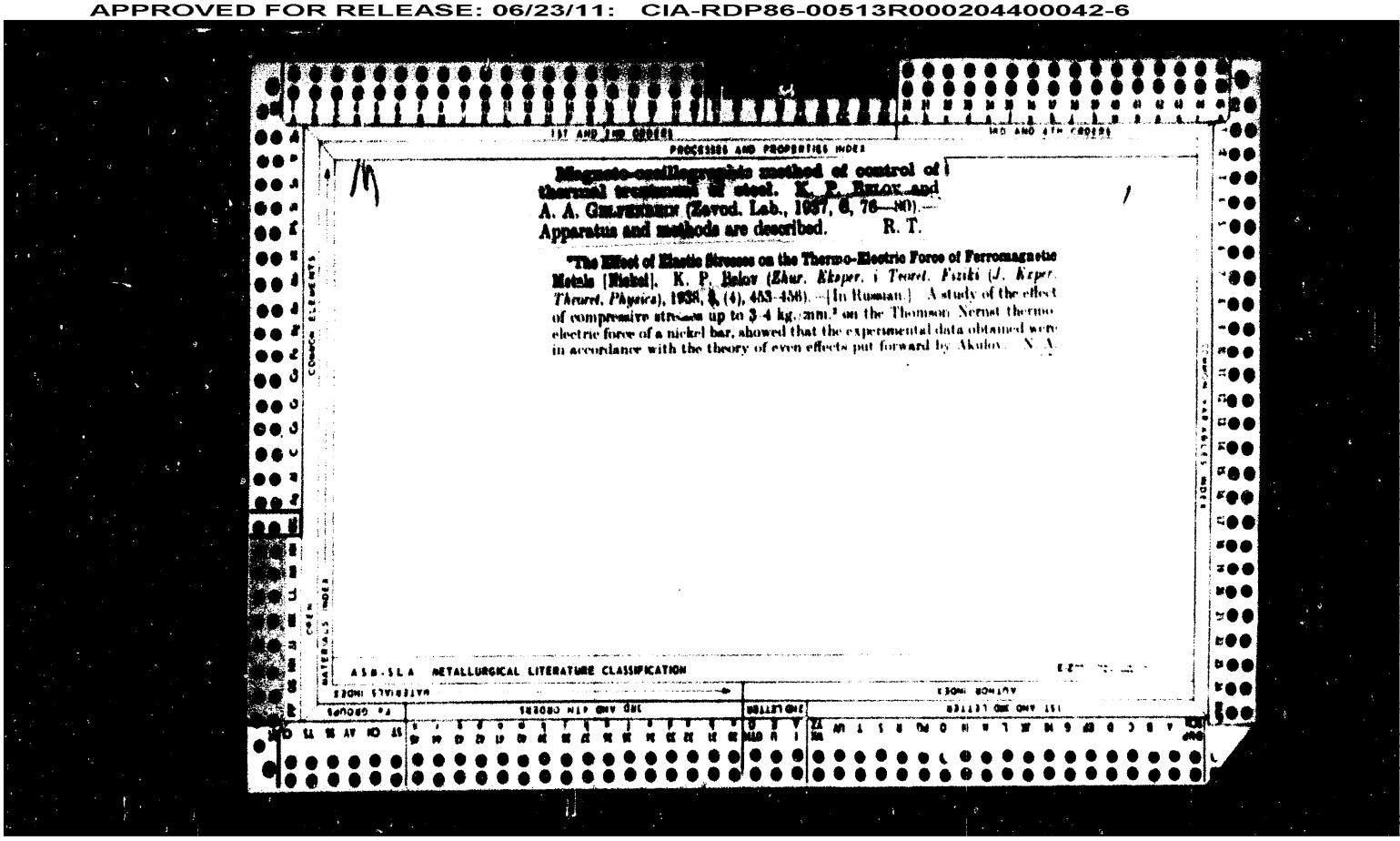
Card 3/3

BELOV, K. M., CAND PHYS-MATH SCI, "CERTAIN PROBLEMS ON GEOMETRY OF CONVEX SURFACES AS A WHOLE." MOSCOW, 1961. (MATH INST IM V. A. STEKLOV, ACAD SCI USSR). (KL, 3-61, 202).



B.[illegible], E.V.

Surfaces of [illegible]
726-729 31[illegible]64



PROCESSES AND PROPERTIES INDEX

Magneto-oscillographic method of control of thermal treatment of steel. K. P. BELOV and A. A. GRAVENHEIM (Zavod. Lab., 1937, 6, 78—80).— Apparatus and methods are described. R. T.

"The Effect of Elastic Stresses on the Thermo-Electric Force of Ferromagnetic Metals [Nickel]. K. P. Belov (*Zhur. Eksper. i Teoret. Fiziki* (*J. Exper. Theoret. Physics*), 1938, **8**, (4), 453–458). —[In Russian.] A study of the effect of compressive stresses up to 3–4 kg./mm.² on the Thomson Nernst thermo-electric force of a nickel bar, showed that the experimental data obtained were in accordance with the theory of even effects put forward by Akulov. N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Effect of Elastic and Residual Deformations on the Galvanic Effect of Ferromagnetic Materials (Nickel). K. P. Belov and D. I. Volkov (*Zhur. Tekhnol. Fiziki (J. Tech. Physics)*, 1939, **9**, 1529–1539; *Chem. Zentr.*, 1940, **111**, (I), 2132).—[In Russian.] In plastic deformation, zones of tensile and of compressive stresses in the metal can be postulated, the magnitude, number, and direction of which depend on the nature of the deformation. B. and V. assume a model of distribution of internal stresses in a nickel wire after plastic deformation, in which tensile and compressive zones alternate periodically in the cross-section. Corresponding to the stress directions, the magnetization vectors lie parallel and vertical to the axis of the wire, thus explaining the decrease of galvanomagnetic effect by 25% in drawn nickel compared with annealed soft nickel. Galvanometric and similar effects may serve in general as sensitive indicators of the internal stress distribution in ferromagnetic metals.

Sci. Res. Inst. Physics, Moscow State U

BELOV, K. P.

PA 57T81

USSR/Phys
Magnetostriction
Invar

Nov/Dec 1947

"Temperature Dependence of the Magnetostriction of Invar Alloys," K. P. Belov, O. N. Agasyan, Sci Res Inst Phys, Moscow State U, 6 pp

"Izv Akad Nauk SSSR, Ser Fiz" Vol XI, No 6

Invar, elinvar, kovar, and similar alloys have anomalies of their volume and elastic properties with very complex dependence upon temperature. According to present hypotheses, the nature of these anomalies is clearly connected with the ferromagnetism of these alloys, and primarily determined by

[redacted] 57T81

USSR/Phys (Contd)

Nov/Dec 1947

character of flow of the ferromagnetostriction phenomena. This study of magnetostriction of these alloys and especially the dependence upon temperature is of interest since it makes possible determination of the nature of the anomalous properties of Invar-type alloys.

[redacted]

57T81

USSR/Phys
Ferromagnetism
Invar

Nov/Dec 1947

"Ferromagnetic Nature of Properties of Invar and Elinvar Alloys," K. P. Belov, Sci Res Inst Phys, Moscow State U, 4½ pp

"Izv Akad Nauk SSSR, Ser Fiz" Vol XI, No 6

PA 57T85

On the basis of results of this study rational explanation is given of the anomaly of thermal expansion in Invar alloys and of the low temperature coefficient of the modulus of elasticity of elinvar. Using data obtained by measurement of magnetostriction and susceptibility in the paraprocess field,

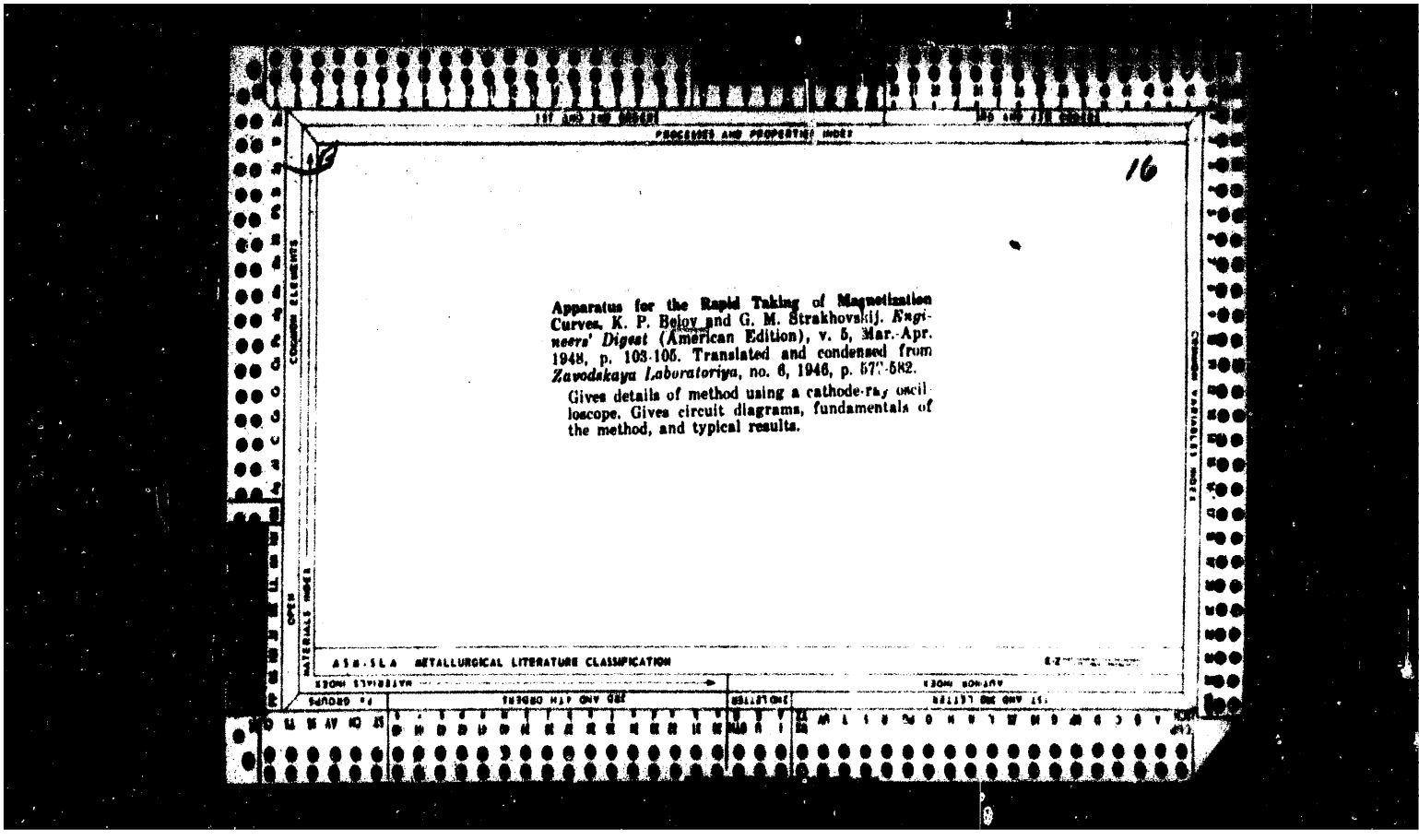
57T85

Correctness of the "ferromagnetic" explanation of the thermal expansion anomaly of Invar is shown.

57T85

BELOV, K. P.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400042-6



16

Apparatus for the Rapid Taking of Magnetization Curves. K. P. Belov and G. M. Strakhovskij. *Engineers' Digest* (American Edition), v. 5, Mar.-Apr. 1948, p. 103-105. Translated and condensed from *Zavodskaya Laboratoriya*, no. 6, 1946, p. 677-682.

Gives details of method using a cathode-ray oscilloscope. Gives circuit diagrams, fundamentals of the method, and typical results.

BELOV, K.P.

Slizade, Z. I. and Belov, K.P. "The effect of elasticity (tension) on the magnetic induction of the Fe-Pt alloy," Vestnik Mosk. un-ta, 1948, No. 9, p. 47-49

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

BELOV, K. P.

Belov, K. P. - Experimantal demonstrations of the ferromagnetic nature of anomalies in the thermal expansion of Invar steels," (Paper read at the Lomonsov readings in the Physics Faculty of Moscow University, April 1948), Vestnik Mosk. un-ta, 1948, No. 11, p. 89-94 --- Bibliog: p. 94

So: U-3566, 15 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 13, 1949)

BELOV, K. P.

USSR/Physics
Ferromagnetism
Magnetism

Aug 48

"The Action of Strains on the Magnetization of Ferromagnets in the Paraprocess Region," K. P. Belov, Sci Res Inst of Phys, Moscow State U imeni M. V. Lomonosov, 4 pp

"Dok Ak Nauk SSSR" Vol LXI, No 5

Belov takes issue with Gerlakh's conclusion that elastic deformation has no effect on the value of spontaneous magnetization, but only causes its orientation.

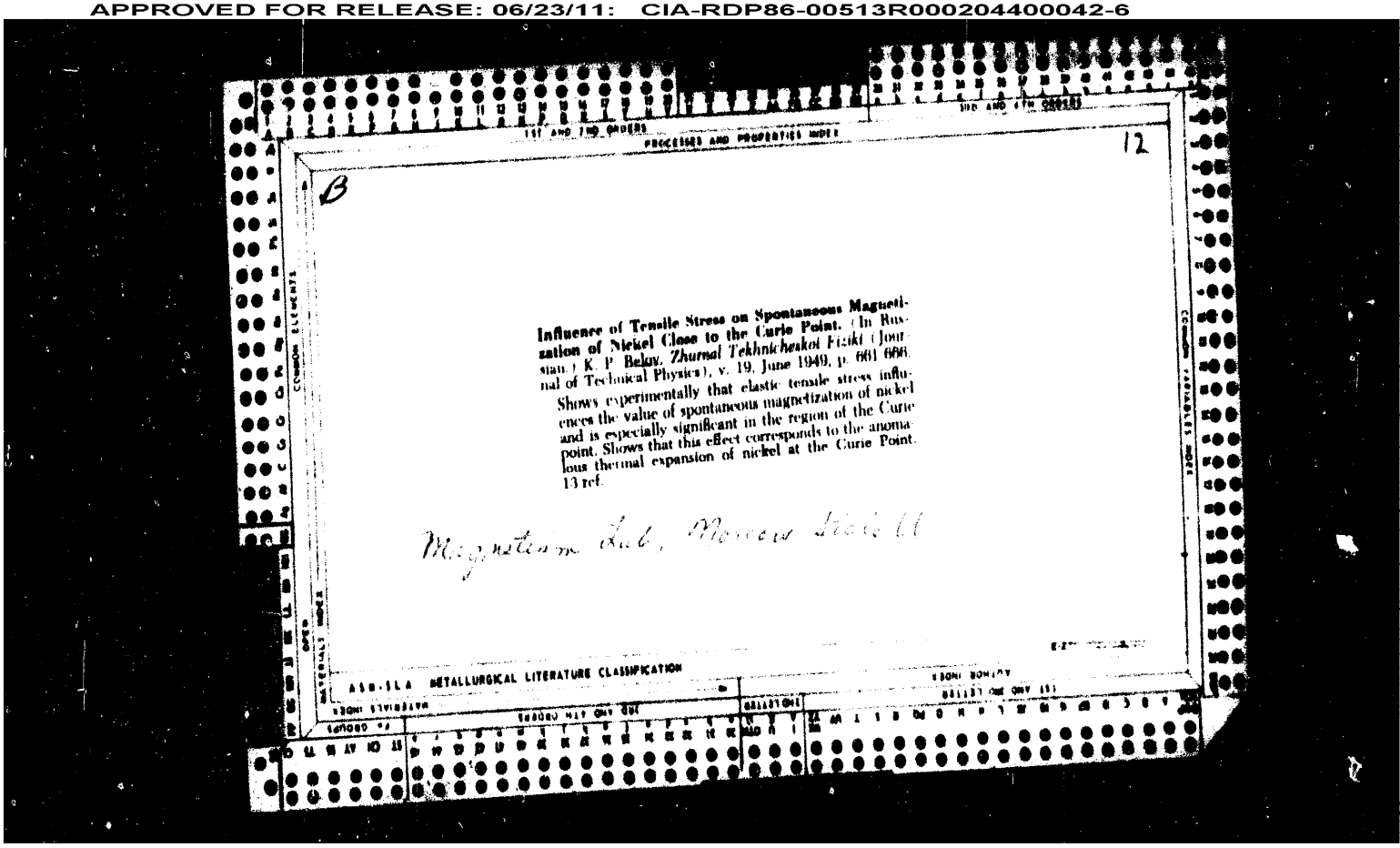
24/49T116

CA

2

Displacement of the Curie point of ferromagnetic alloys under the action of tension. K. P. Belov (Moscow State Univ.). *Zhur. Eksptl. Teoret. Fiz.* 19, 346-52(1949); cf. *C.A.* 43, 4589b.—The displacement of the Curie point is calcd. by use of thermodynamic equations and with consideration of the ferromagnetic transition as a 2nd-order transformation, from measurements of the change of the satn. magnetization caused by deformation. It is small for Ni and Ni-Cu alloys and large for Invar steels. Curves and data are given of the change of the satn. magnetization during stretching, $(\partial I_s/\partial p)$, as a function of temp., and of $I_s(t)$; values of $\Delta(\partial I_s/\partial p)$ and $\Delta(\partial I_s/\partial t)$ are taken from these curves, and the shift of the Curie point, $d\theta/dp$, is calcd. from them. For Ni and the alloy Cu 20, Ni 80%, $d\theta/dp$ is, resp., -1.47×10^{-6} and -1.9×10^{-6} degree cm.^{2}/kg. For the Invar steels it increases; for Ni 32, Fe 68% it is $+15.2 \times 10^{-6}$. This effect is explained qualitatively on the basis of the Frenckel-Heisenberg theory, according to which the Curie temp. depends on the exchange energy that is detd. by the interat. distances. During compression the Curie points of Ni and of the Cu-Ni alloy increase, reach a max., and then decrease as the compressive deformation is increased. Hence terrestrial magnetism cannot be explained as the "ferromagnetism" of the Earth's core, because for Fe, Ni, and Fe-Ni alloys the Curie point is lowered by great pressures.

Ellen H. Dunlap



BELOV, K. P.

538.221 : 538.652 370

The Magnetostriction of Fe/Pt Alloys. - N.S. Akulov, Z.I. Alinade & K.P. Belov. (C. Acad. Sci. U.R.S.S., 21st April 1949, Vol. 65, No1 6, pp. 815-818. In Russian)

Curves are shown for various alloys, the highest value of magnetostriction being found for the system 46%Fe/54% Pt. The effect of different treatments on this alloy is studied.

Immediate source clipping

Doc Physicomath Sci

BELOV, K. P.

Dissertation: "Magnetic-Elastic Effects in Ferromagnetic Materials in the Region of Paraprocess."
18/10/50

Moscow Order of Lenin State U imeni

M. V. Lomonosov

SO Vecheryaya Moskva
Sum 71

BELOV, K. P.

USSR/Physics - Alloys — Magnetostriction — Jan 50

"Magnetostriction of Ferromagnetic Alloys in the Region of the Paraprocess," K. P. Belov, Inst of Phys, Moscow State U, 7 pp

155T57

"Zhur Eksper i Teoret Fiz" Vol XX, No 1

Results of measurements on transverse and longitudinal effects of magnetostriction in alloys of the invar group in magnetic fields higher than "technical" saturation (the region of the paraprocess): the unusually high, in comparison with other alloys, magnetostriction observable in these alloys in

155T57

USSR/Physics - Alloys (Contd) — Jan 50

connection with the paraprocess is explained not so much by low position of the Curie point in these alloys as by peculiarities of their structure, which provide very sharp dependence of the volume integral upon the lattice parameter. Submitted 16 Jul 49.

155T57

BELOV, K. P.

PA 165T80

USSR/Physics - Magnetism
Magnetostriction

11 Mar 50

"Theory of the Even Effect," K. P. Belov, Inst of Phys, Moscow State U imeni Lomonosov

"Dok Ak Nauk SSSR" Vol LXXI, No 2, pp 261-264

Studies dependence of galvanometric effect in Te-Cr alloys and Ni upon magnetic field in Curie region. Considers temperature dependence of galvanometric effect in Ni in the Curie region for various field strengths (H = 2 to 10 oersteds) and magnetostriction of Ni-Fe alloy. Submitted 20 Jan 50 by Acad S. I. Vavilov.

165T80

BELOV, K.P.; GUSEV, A., redaktor, GOLUBKOVA, L.A., tekhnicheskiy redaktor.

[Elastic, thermal and electric phenomena in ferromagnetic metals] Uprugie, teplovye i elektricheskie iavleniia v ferromagnitnykh metallakh. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1951. 254 p. [Microfilm] (MLRA 7:12)
(Ferromagnetism)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400042-6

BELOV, K. P.

189T85

USSR/Physics - Paramagnetism Jul 51

"Galvanomagnetic Properties of Iron-Nickel Alloys in the Region of Paraprocesses," K. P. Belov, I. K. Panina, Moscow State U

"Zhur Eksper i Teoret Fiz" Vol XXI, No 7, pp 809-813

Examines galvanomagnetic effect in invar iron-nickel alloys in magnetic flds above technical satn and near Curie point (region of paraprocesses) for various temps. Gives results in graphs. Submitted 3 Jul 50.

LC

189T85

USSR/Metals - Alloys, Properties 21 Oct 51

"On the Nature of Elastic Anomalies in Alloys of Invar and Elinvar Types," K. P. Belov, O. N. Agasyan, Sci Res Inst of Phys, Moscow State U imeni M. V. Lomonosov

"Dok Ak Nauk SSSR" Vol LXXX, No 6, pp 881-883

Reviews attempts to explain elastic anomalies by mechanostriction and attributes them to same ferromagnetic volumetric effects which cause anomalies of thermal expansion and density. Discusses temp

217T45

dependence of elasticity modulus and develops formula expressing relation between temp coeff of elasticity modulus and coeff of thermal expansion. Submitted by Acad A. F. Ioffe 17 Aug 51.

217T45

BELOV, K. P.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400042-6

BELOV, K. P.

241T87

USSR/Physics - Ferromagnetics Jul/Aug 52

"Investigation of Magnetoelastic Phenomena in Ferromagnetics in the Region of the Paraprocess," K. P. Belov, Sci-Res Ins of Phys, Moscow State U

"Iz Ak Nauk, Ser Fiz" Vol 16, No 4, pp 420-431

Discusses magnetoelasticity and magnetostriction effects of special nature due to magnetization above the tech satn pt, during which momenta of domains are fully oriented in the direction of the magnetic field and magnetization increases slightly on account of variation of spin within the domain.

241T87

BELOV, K.P.

Thermodynamics of volumetric and elastic phenomena in ferromag - netic materials near the Curie point. Uch.zap. Mosk. un no.162:15-20 '52. (Ferromagnetism) (MLRA 8:7)

BELOV, K.P.

Temperature dependence of the susceptibility of the para-process of invar alloys. Uch. zap. Mosk. un. no.162:21-32 '52. (MLRA 8:7)

(Nickel- iron alloys--Magnetic properties)

BELOV, K

Erscheinungen In Ferromagnetischen Metallen. Berlin, Technik, 1953.
222 P. Diagrs., Tables.
Translation From The Russian, "Uprchgiye Teplovyi I Elektricheskiye I Elektricheskiye Yavleniya V Ferromagnitnykh Metallakh," Moscow, 1951.
"Literatur": At the end of each chapter.

SO: N/5
613.842
.B4

USSR/Metallurgy - Invar, Anomalous Jan 53
Thermal Expansion

"Magnetostriction and Thermal Expansion of Invar Alloys Near the Curie Point," K. P. Belov, V. V. Shmidt

Zhur Tekh Fiz, Vol 23, No 1, pp 44-49

Contributes to substantiation of hypothesis on connection of anomaly of Invar thermal expansion with ferromagnetism. Using specially designed dilatometer, studies magnetostriction and thermal expansion vs temp on same specimen of alloy with 36%

270T90

Ni, 1% Mo, 63% Fe. Uses data obtained for calculating ferromagnetic portions of coeff of thermal expansion and density of Invar.

270T90

ILLEGIBLE

BELOV, Konstantin Petrovich, doktor fiziko-matematicheskikh nauk; PLOTNIKOV, A.F., redaktor; AKHLAMOV, S.N., tekhnicheskiy redaktor

[What is magnetism?] Chto takoe magnetizm. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry, 1955. 62 p. (Nauchno-populiarnaia biblioteka, no.81) (MLRA 9:2)

(Magnetism)

BELOV, K.P.; ZAYTSEVA, G.A.

Galvanomagnetic properties of ferromagnetic materials near the Curie point. Fiz. met. i metalloved. 1 no.3:404-409 '55.
(MLRA 9:6)

1.Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.
(Ferromagnetism)

BELOV, K. P., GORYAGA, A. N., and PAKHES, Y. (Moscow)

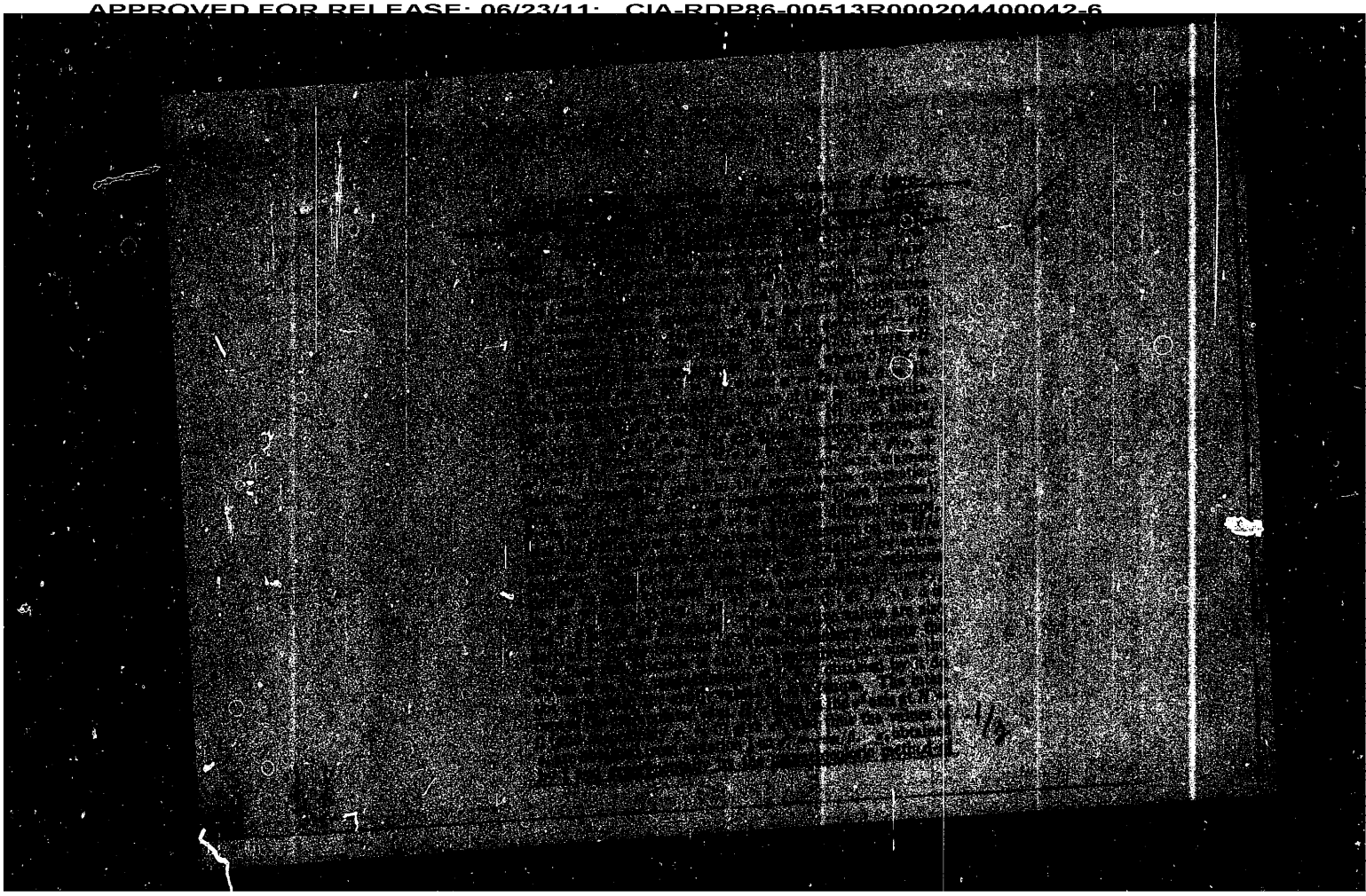
"Thermodynamic Investigation of Ferromagnetics Substances in the Region of the Curie temperature," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

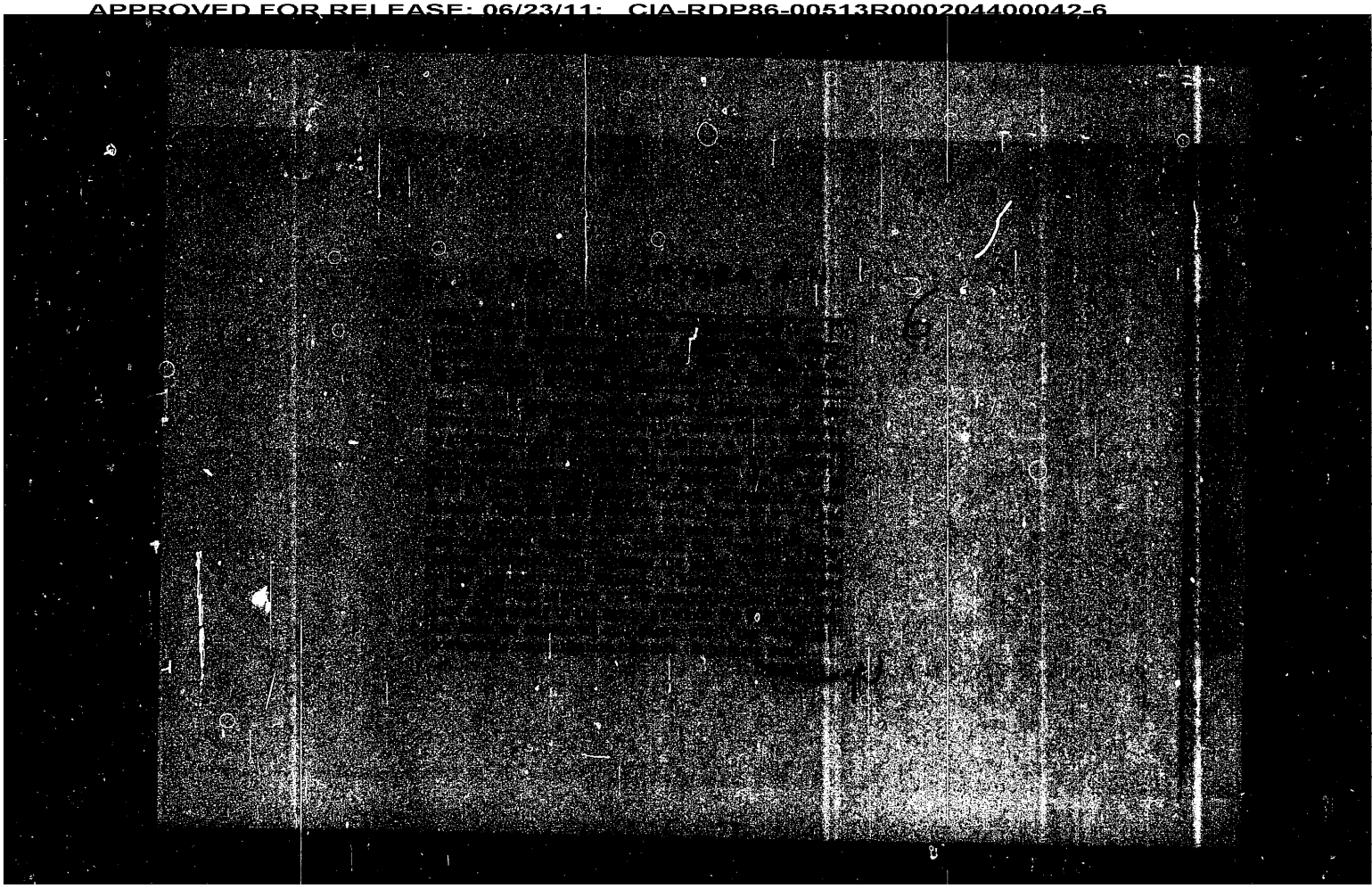
BELOV, K. P., BOLSHOVA, K. M., and YELKINA, T. A., (Moscow)

"The Study of Magnetization of Ferrites in the Region of the Curie Point," a paper submitted at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, 23-31 May 56.

ILLEGIBLE

ILLEGIBLE





APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204400042-6

ILLEGIBLE

BELOV, K.P.

USSR / Magnetism. Ferromagnetism F-4

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6845

Author : Belov, K.P.
Inst : Moscow State University, Moscow
Title : Concerning the Thermodynamic Theory of Magnetoelastic and Magnetostruction Phenomena in Ferromagnetics.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 3, 447-453

Abstract : The influence of elastic stresses on spontaneous magnetization and magnetostriction of the para-process near the Curie point is examined from the thermodynamic point of view. Equations are given for the dependence of these effects on the elastic stresses, on the magnetic field, and on the temperature. The theoretical deductions are in agreement with the experimental data.

Card : 1/1

BELOV, KONSTANTIN PETROVICH

PHASE I BOOK EXPLOITATION 404

Belov, Konstantin Petrovich

Uprugiye, teplovyye i elektricheskiye yavleniya v ferromagnetikakh (Elastic, Thermal and Electric Phenomena in Ferromagnetic Metals) 2d ed., enl. Moscow, Gostekhizdat, 1957. 279 p. (Fiziko-matematicheskaya biblioteka inzhenera) 7,000 copies printed.

Eds.: Alekseyev, D. M. and Denisov, I. I.; Tech. Ed.: Akhlamov, S. N.

PURPOSE: The monograph is intended for specialists engaged in the investigation, research and utilization of magnetic materials. It can also be of use to students of specialized vuzes.

COVERAGE: The monograph represents a systematic account of the latest data on elastic, thermal and electric phenomena in ferromagnetic metals, alloys and ferrites (magnetostriction, elastic stress effect on magnetization, galvano - and thermo magnetic effects, thermal expansion, heat capacity, electric resistance, etc. The author has introduced, wherever possible,

Card 1/8
2-

new experimental data, in particular, the results of experiments made at the laboratories of Moscow University. He pays special attention to the presentation of experimental results obtained from the study of elastic, electric and change-of-volume phenomena in the ferromagnetic metals and alloys in the third region of the magnetization process (above technical saturation and close to the Curie point). The author studied extensively the little explored phenomena accompanying the third region of the magnetization process, termed here the "paraprocess". The author describes in detail the results of his own investigations, which offer a better understanding of the properties of Invar and Elinvar steel types. In writing the book, the author took care to present the general physical picture of the pehnomena, ideas and experimental data in such a way as to make the book accessible to engineers and scientist not specialists in the field of ferromagnetism, as well as to students of universities and higher technical schools studying this field of solid-state physics. The first edition of the book was translated into German in 1953 under the title "Erscheinigungen in Ferromagnetischen Metallen." This second edition contains supplementary information on data published between 1951-1957. There are several references to Soviet personalties in the text. There are 287 references, 181 of which are Soviet (including 2 translations), 58 English, 28 German, 18 French, 1 Czech, 1 Rumanian .

BELOV, K.P.

137-58-1-1555

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 208 (USSR)

AUTHORS: Belov, K. P., Panina, I. K.

TITLE: Effect of the K State on the Temperature Dependence of Spontaneous Magnetization and Magnetostriction (Vliyaniye K-sostoyaniya na temperaturnuyu zavisimost' spontannov namagnichennosti i magnitostriktsii)

PERIODICAL: Vestn. Mosk. un-ta, ser. matem., mekhan., astron., fiz., khimii, 1957, Nr 1, pp 44-46

ABSTRACT: Measurement of the temperature dependence of spontaneous magnetization σ_s and the magnetostriction constant λ was performed on an invar-type alloy (36% Ni, 6% Mo, 58% Fe), in which ordering does not occur. The purpose of the tests was a study of the low-temperature annealing in alloys in which a K state obtains. After hardening from 950°C and 8-hour tempering at 500°, an increase in electrical resistivity, which was ascribed to the K state, was observed in the alloy. The variation of the $\sigma_s = f(t)$ and $\lambda_s = \varphi(t)$ curves in the 20-200° interval was determined by extrapolation of the curves for the relationship of magnetostriction to the square of magnetization

Card 1/2

Effect of the K State on (cont.)

and by the method employing the thermodynamic coefficient. It is shown that after heat treatment corresponding to that required for the formation of the K state, the alloy has two Curie temperatures (155 and 168°), testifying to the appearance of "atomic segregation", exhibiting the properties of a phase with 155° as its Curie(magnetic transformation) temperature.

V. R.

1. Magnetostriction--Temperature effects 2. Magnetism--Measurement

Card 2/2

Belov, K.

AUTHOR: Belov, K. and Paches, Ya.

TITLE: Temperature characteristic of spontaneous magnetisation in alloys in the Curie-point temperature range. (O temperaturnom khode zamoproizvol'noy namagnichennosti v splavakh v oblasti tochki kyuri.)

PERIODICAL: Fizika Metallov i Metallovedenie," (Physics of Metals and Metallurgy), 1957, Vol. [illegible] No. 1 (10), pp. 48-53, (U.S.S.R.)

ABSTRACT: The curves of the temperature dependence of spontaneous magnetisation in the Curie-point range for nickel and some nickel alloys were determined by three differing methods. It was established that the so-called "tails" in the curves of spontaneous magnetisation in the Curie point temperature range are particularly large in these alloys. Their shape and length is strongly dependent on the heat treatment and concentration of the element which is alloyed with the nickel. On the basis of analysis of the experimental material on magnetic and electric phenomena in nickel alloys a more accurate method of determination of the Curie temperature is proposed. To obtain reliable results on the temperature characteristics of the spontaneous magnetisation near the Curie point the Curie point was determined for each specimen by the following three methods: the spontaneous magnetisation I_s was determined from the curves "galvano-magnetic effect - square value of the magnetisation", which were recorded for the specimens under

Temperature characteristic of spontaneous magnetisation in alloys in the Curie-point temperature range. (Cont.)

consideration in the Curie point range; the values of I_s were determined by the method of "lines of equal magnetisation" which is based on the evaluation of the magnetisation isotherms recorded in the Curie temperature range and has been described by Weiss and Forrer (Ann. d. Phys., 1926, 5, 153); I_s was determined by the method of "Thermo-dynamic coefficients" described by Belov and Goryaga (same journal, 1956, Vol.II, No.1, p.3, etc.) which is based on comparing the experimental magnetisation isotherms with the equation of the real magnetisation resulting from the thermo-dynamic theory of ferromagnetic transformation. The curves obtained according to these three methods are compared. The Curie point determined on the basis of the thermo-dynamic coefficients is always above the maximum of the temperature coefficient of the resistance and the negative galvano-magnetic effect; at this temperature the major part of the specimen is in the paramagnetic state and the $I_s(T)$ curve has the character of a tail, which indicates that only small sections of the specimen are in the ferromagnetic state. Therefore, this method of determination of the Curie point is considered the most correct and it is simpler than measuring the temperature dependence of such "non-magnetic" phenomena as the electric resistance, galvano-magnetic effect, the heat

Temperature characteristic of spontaneous magnetisation in alloys in the Curie-point temperature range. (Cont.)

capacity, etc., since in this case it is only necessary to measure magnetic values. For non-uniform materials the average Curie temperature can be determined from the curves of the real magnetisation. The magnetic values were determined according to four different methods for the following materials: Nickel, nickel + 3.1% Si, Ni + 4.9% Si, same after annealing, Ni + 2.5% Mn, Ni + 20% Mn, 38% Ni + 52% Fe. The numerical data for these materials are given in a table, p.52. 5 figures, 1 table. 4 references, 2 of which are Russian.

Moscow State University imeni V.M. Lomonosov. Recd.Mar.21, 1956.

AUTHOR: Belov, K.P. and Panina, I.K. 129

TITLE: Calculation of the shift in the Curie temperature as a function of the pressure on the basis of magnetostriction data. (Vychislenie velichin smeshcheniya temperatury kyuri ot davleniya iz magnitostriktsionnykh dannykh.)

PERIODICAL: "Fizika Metallov i Metallovedenie" (Physics of Metals and Metallurgy), 1957, Vol. IV, No.1 (10), pp.185-186 (U.S.S.R.)

ABSTRACT: On the basis of the theory of Type II phase transitions an equation was derived in an earlier paper of the author (same journal, 1956, Vol.2, No.3, p.447) for calculating the real magnetisation near the Curie point, taking into consideration elastic stresses acting on the ferro-magnetic:

$$(\alpha + \gamma\Delta p)\,\sigma + \beta\sigma = H$$

where σ - specific magnetisation;
Δp - stress, for instance hydrostatic pressure;
α and β - temperature dependent thermodynamic coefficients;
γ - magnetostriction.

It is shown that by determining γ from the magnetostriction - square of real magnetisation curves measured near the Curie point it is possible to carry out the desired calculations. Calculated data are given for various Ni-Fe, Ni-Fe-Co, Ni-Fe-Mo Ni-Fe-W etc. alloys. 2 graphs, 1 table, 5 references, four of which are Russian.

Moscow State University
imeni M. V. Lomonosov.

Recd. July 28, 1956.